

Annual Report 2009



Norsk Romsenter
NORWEGIAN SPACE CENTRE



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Chairman*

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*Bo Nyborg Andersen
Managing Director*

Management

Bo Nyborg Andersen, Managing Director

Objectives

In accordance with governmental guidelines and in co-operation with and to benefit Norwegian industry, research, public-sector bodies and Norwegian interest in general, the objectives of the Norwegian Space Centre are to:

- promote the development and coordination of Norwegian space activities,
- co-ordinate the Ministerial interests and needs within space activities,
- prepare proposals for integrated long-term programmes for Norwegian space activities and submit these to the Ministry of Trade and Industry,
- manage Norwegian Space Centre resources and efficiently distribute funding from the Norwegian State and other sources,
- mind Norwegian interests in liaison with space sector organizations in other countries as well as international organizations and contribute to coordinating Norwegian space activities with those elsewhere,
- manage State holdings in space-related companies in the private sector,
- facilitate the meeting of user needs in the space sector.

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From the Director

For the Norwegian Space Centre, 2009 was an exciting, challenging year. Up to 2009, participation in the ESA mandatory and optional programmes accounted for almost all the international investment in Norwegian governmental space activities. This has manifested itself through Norwegian commitments at ESA Council meeting at ministerial level. At the last two of these meetings, Norway pledged more than 210 million Euros to join two new programmes. These investments lead to development tasks for Norwegian companies and afford Norwegian users access to vital information on environment and climate as well as to new services having public benefit.

The EU is becoming an increasingly more important player in the European Space Arena. The involvement of such a pivotal political entity is based on an understanding of the strategic importance of the space sector. The Treaty of Lisbon of 2009 defines the EU's stronger role in space policy. Norway's role in the space sphere in Europe, as a member of the ESA but not the EU, is challenging. EU member

countries automatically benefit from EU activities, but Norway must take an active, independent standpoint on all participation and financing. This can be a positive exercise, because it ensures that Norway's space commitment is visible and thorough.

Consequently, from both the industrial and user viewpoints, it is encouraging that Norwegian authorities agreed to full participation in the EU development of the Galileo satellite navigation system. The ESA remains our principal policy instrument for space activities, but we see rapprochement between the ESA and the EU. For Norway, it is vital that international cooperation in ESA be strengthened and that the ESA continues and evolves as the European space organization.

The Norwegian space industry is developing well. The telecommunications sector has undergone a thorough restructuring after sales and closings. But most of its expertise apparently has been retained, as established and new firms develop impressively. The Norwegian space industry faces several challenges, in

part because its companies do not belong to the large international consortia.

Throughout the year, the Norwegian Space Centre advised a committee that assessed the potential of a national project for meeting defence needs for satellite communications. The committee concluded that such a project would be both possible and useful. But on the basis of an overall assessment, the Government chose another solution.

The use of space in Norwegian administration has been strengthened and in many sectors access to space data is decisive, such as in maritime and sea monitoring. The Norwegian Space Centre has prioritized the administration of large sea areas in the high north and around Svalbard, so it is encouraging that the first Norwegian maritime ship-tracking satellite was completed in 2009 and is now ready for launch.

Norsk Romsenter, 08. 02. 2010



Bo Andersen

Data from Earth observation satellites is increasingly used by scientists and in management of Norwegian resources. This image of a snow covered West Norway was taken 9 February 2010 by the ESA environmental satellite ENVISAT. ©ESA



“In 2015 Norway shall be the country that benefits most from space.”

That vision focuses on Norway's advantage in being an active space country. The Board of the Norwegian Space Centre (NSC) believes that one of its principal responsibilities is to realize the vision through its decisions and prioritizations in cooperation with Space Centre management.

The Norwegian Space Centre is a State administrative agency under the Ministry of Trade and Industry and in 2009 had a budget of NOK 501 million (€60 million) and a staff of nearly 30.

Needs and potentials

Norway administers large maritime zones in a part of the world where the climate is harsh, nature is vulnerable and resources are great. This is reflected in the Government's High North Strategy. Success in the management task relies on a basis of reliable, updated information supplied to a great degree from space. Earth observation satellites supply abundant data on climate, environmental conditions, pollution, weather and other information useful for Norwegian authorities and research institutions. Moreover, fleets of communication and navigation satellites contribute information in the high north.

NSC believes that it is essential that space be employed in ever more fields where its relevant infrastructures can bring about solutions. Norwegian space prioritization has always been based on the utility perspective together with business development. In 2009 everything fell into place when the Storting (Parliament) approved Norway's participation in the implementation of the Galileo satellite navigation system. The Norwegian Space Centre is pleased to have contributed to that decision through its role as manager of Norwegian space activities. The Galileo system will improve navigational safety and permit Norwegian companies to bid on its construction contracts.

Primary objectives

The Norwegian Space Centre works according to five main objectives. These are to contribute to growth in national, high-tech industry, meet social needs, ensure that Norway plays a leading role in the global market for space-related ground structure, contribute to Norwegian research attaining prominent international positions in space research and ensure that the public is well aware of Norwegian space activities.

Membership in the European Space Agency (ESA) is instrumental in attaining these objectives. About 85% of the Ministry of Trade and Industry's appropriations for the Norwegian Space Centre are for ESA membership. The Norwegian Space Centre supports Norwegian interests in ESA and coordinates national space activities.

New arenas

Over the past few years, cooperation with the EU has become increasingly important for Norwegian space activities. So the Board favours Norway's having joined the Galileo European Satellite Navigation Programme through the EEA agreement in 2009.

In the next few years, Norwegian participation in the EU-supported Earth observation initiative, the Global Monitoring for Environment and Security (GMES) will be important for domestic industry and management. Bilateral agreements with Canada, France, Japan and the USA also are important for Norwegian space activities.

Norwegian space activities support key governmental priorities such as the High North Strategy and the Maritime Strategy. Successful implementation of these initiatives depends upon stepped up involvement in fields including Earth observation, satellite navigation and satellite communication.

National support scheme

The Norwegian Space Centre manages the national support scheme. This is a subsidy arrangement under which Norwegian companies and research

institutions can apply for support of space-related research and development activities. The funds are used to support technological development in Norwegian companies or institutes that aim to position themselves for future space deliveries or for use of data from satellites. Moreover, the funding is used to ensure infrastructure vital to society.

For several years, the Board has felt that it is vital that the support scheme leads to industrial development and work places in Norway. In 2009, the success of companies such as Norspace and Spacetec showed that a support scheme can be decisive in developing technologies that subsequently are profitable.

Moreover, the funding enabled the Norut's research group to develop methods for monitoring avalanche danger areas. The technology uses radar data from Earth observation satellites to reveal bedrock movements. Such information is vital in Norwegian land management and illustrates yet another of the increasingly practical and socially useful applications of space technologies.

In 2009, the national support scheme amounted to NOK 43.2 million (€2 million), of which NOK 12.5 million (€1.5 million) was for finishing the building of the Norwegian AIS satellite to be launched in 2010, NOK 15.8 million (€1.9 million) was earmarked for industrial development, NOK 8.4 million (€1 million) for Earth observation services development and NOK 6.5 million (€783,000) for scientific, technological and educational development.

Space industry

Space industry is a vital business sector in the country. In 2009, the turnover of Norwegian-produced goods and services in the space sector amounted to NOK 5.6 billion (€674 million), of which 72% went to export (Figure 1). The Board emphasizes that further growth depends on increased commitment, both public and private.

Satellite communication accounted

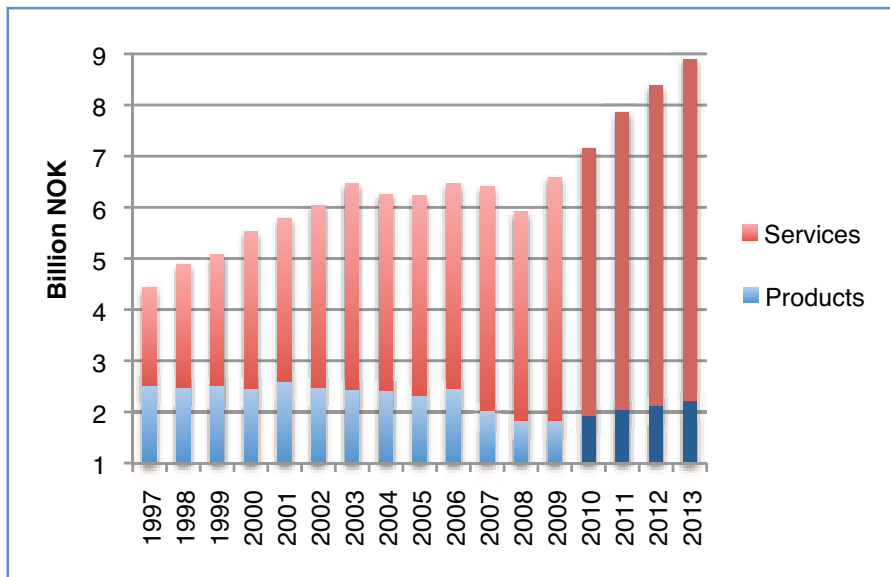


Figure 1. Turnover of Norwegian-produced goods and services, from 1997 to 2009. Company forecasts up to 2013 are shown in darker colours.

for 70% of the space-related turnover in Norway. Changes in ownership in the space sector have led to the development of new products and to the founding of new companies in user equipment and services.

New high-tech companies that arose in research communities as well as defence and oil sector companies have successfully developed space-sector niche products for the international space market. The Space Centre cooperates with ESA and various Norwegian actors to support innovation and technology transfer between ground-based and space activities.

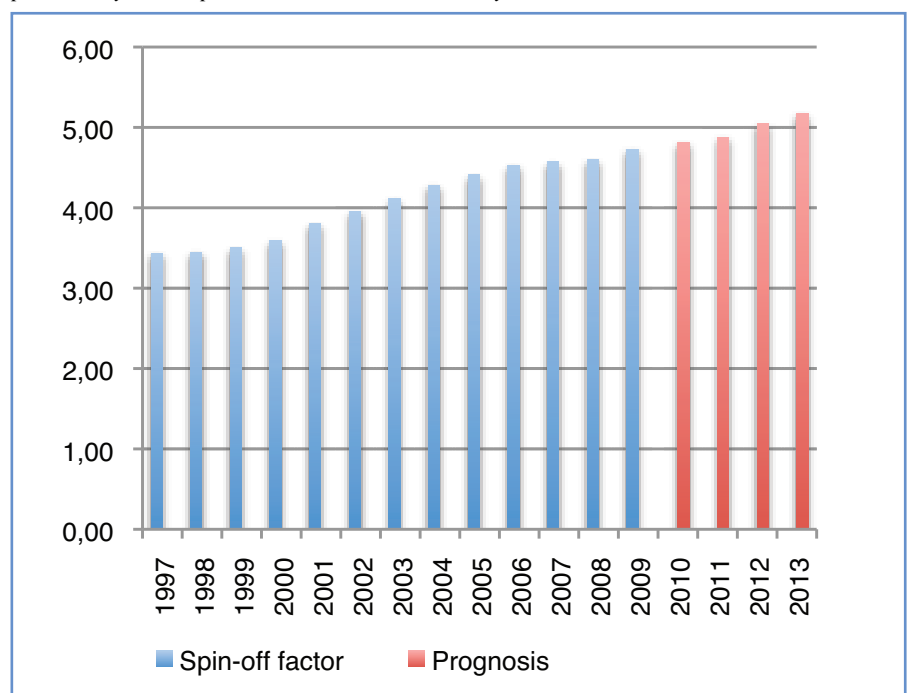
The building of new satellites and instruments is based on exacting technological development. At the 2005 and 2008 ESA Council meetings at ministerial level, the General Support Technology Programme (GSTP) was among the programmes prioritized for Norway. NSC is active in compiling plans for GSTP. The technology initiatives strengthen the positions of Norwegian actors in institutional and commercial space programmes. As a result, contracts have been awarded for deliveries to ESA scientific and Earth observation satellites.

In 2009, deliveries of the Norwegian space industry to ESA programmes

amounted to NOK 252 million (€30.3 million).

In 2009, the spin-off effect factor continued to climb, to 4.7, as shown in Figure 2. This means that for each NOK of governmental support through ESA or the national support scheme,

Figure 2. The spin-off factor is a measure of the effect of Norwegian space commitment through ESA and national support scheme. The figures shown are based on information provided by 26 companies and institutes in Norway.



space-sector companies have on the average attained an additional turnover of 4.7 NOK. In addition, ESA contracts add nearly 1 NOK.

The international space station and space transport

The international space market is booming. In 2009 there were 10% more launches than in 2008. The Ariane 5 dominated the commercial launch market with seven launches in 2009. In 2009, Norwegian companies entered new contracts for a total of NOK 300 million (€36.1 million) for production run supply to Ariane 5. The Norwegian supply includes mechanical structures, thrusters and electronics.

The International Space Station (ISS) was fully manned with six astronauts in early summer. Norwegian space sector companies have contributed logistics and software and in recent years also have taken part in the development of payload modules and technologies associated with uses of the space station.

Satellite communications

Norwegian companies are advanced in the applications and commercial uses of satellite communications. In the last few years, the satellite communications sector in Norway has been in a readjustment phase. With the support of its Board, NSC has helped maintain and further develop the country's capabilities during the restructuring. In turn, this has contributed to developing new companies and to increased activity in existing enterprises, principally in product development and services. Inexpensive, user-friendly ground equipment as well as new services and applications promise to be commercially practical and to have long-range public benefit.

NSC also advised a committee that considered a possible cooperation between the Ministry of Defence and the Ministry of Trade and Industry concerning defence needs for satellite capacity. The committee recommended a national solution that could meet defence needs and as well be a strategic investment that could meet several national needs. The national solution would have led to a boost for Norwegian space activity and satellite communications companies.

In Proposition no. 56 S (2009-2010) to the Storting (Parliament), the national solution and cooperation with Spain were both assessed and found acceptable for the Defence in terms of capacity and cost. However, the Government recommended initiating cooperation with Hisdesat, a Spanish company.

Satellite navigation

Galileo is the largest European joint infrastructure commitment and the largest ever EU space project, with an aggregate budget of €3.4 billion. Galileo is scheduled to be fully operational starting in 2015. In 2011, new services will be available and several satellites will be operational. The first construction contracts were entered at the end of 2009 and all main contracts are expected to be awarded during the first half of 2010. Together with GPS, Galileo will be

Europe's as well as Norway's primary system for positioning, navigation and timing. With its appreciable economic activity, demanding topography and management responsibility for extensive land and sea areas, Norway needs better, more reliable navigational aids. Satellite navigation is a reliable, cost-effective solution.

NSC has been a driving force in working with Galileo, from its start in ESA in 1999 until 2009 when the Storting (Parliament) decided to include Galileo in the EEA agreement.

On 8 July 2009, Galileo was incorporated in the EEA by the decision of the EEA Joint Committee. This gives Norway almost the same rights and obligations in the programme as EU member countries.

The agreement implies that Norwegian companies may bid for Galileo contracts just as can companies in EU member countries. The agreement also allows Norway to use all Galileo services, including encrypted, secure data transmission services for official uses in the participating countries. Moreover, Norway can influence decisions concerning the performance of the system in northern and arctic waters.

The European satellite navigation programme also includes a support system, the European Geostationary Overlay Service (EGNOS), that aims to ensure the quality and reliability of GPS satellite signals.

The open EGNOS service was launched in 2009 and will be certified for commercial aviation in 2010. This means that Norwegian civil aviation authorities can start planning the introduction of EGNOS satellite-based procedures for landing at Norwegian airports.

Over the past few years, NSC has supported the Ministry of Fisheries and Coastal Affairs with revision and follow-up of the Norwegian Radio Navigation Plan.

Earth observation

NSC has long given top priority to greater use of Earth observation data in environmental monitoring and manage-

ment of Norwegian areas. Norway plays an active role in the ESA Earth observation programme concerning the choice of new satellite projects and the ways in which data are used.

Access to satellite data is essential for Norwegian climate researchers in their studies of the seas, the atmosphere, the Arctic and the Antarctic. In 2009, NSC awarded several contracts to Earth observation under the national support scheme. One promising innovation here is the use of satellites to study permafrost.

In addition to its initiative in polar monitoring, NSC has played a pivotal role in the effort to establish global monitoring of tropical forests, as a direct follow-up of the Government's climate and forests project.

In 2009, two new ESA Earth observation satellites were orbited. One of the satellites is for precision measurement of the Earth's gravity field, while the other is for measuring the soil moisture and the salinity of the oceans. Both will supply data useful for Norwegian researchers and management.

Tendering has started for the next generation of ESA weather satellites. The Board regards follow-up of Norwegian interests in this sector as an essential task for NSC.

Space exploration

The Norwegian space research community is prominent in solar physics and cosmology.

In solar physics, the principal research effort is on how solar activity influences conditions on Earth. The ESA space weather programme aims to build up a monitoring and warning service before the next sunspot maximum in 2013-2014. Norwegian actors may participate in the effort.

In cosmology, Norwegian researchers are involved in studies of the origin of the universe. In 2009, the mandatory ESA scientific programme launched the Planck astronomical satellite, in which Norwegian cosmologists have pivotal roles.

In 2009, Norwegian research communities were awarded several key contracts in the space part of the

seventh EU framework programme (FP7). NSC is the national contact for the space part of FP7.

AISSat-1

Safety at sea depends in part on larger ships being required to be involved in the international Automated Identification System (AIS). The system is based on signal dissemination via chains of base stations on land. Hence the range of AIS is limited to 40 – 50 nautical miles from land.

In 2007, the Board gave the go-ahead for developing and building a Norwegian AIS satellite that will relay AIS signals from seagoing vessels and consequently contribute to increasing safety at sea beyond the range of the basic system. Building of the AISSat-1 satellite was finished in 2009 and launch from India is scheduled in the spring of 2010. Norwegian AIS equipment was also delivered and fitted on board the international space station in the course of the year. It will be used in testing AISSat-1.

Communication and education

In April, some 50 enthusiasts watched the launch of ESA's astronomical satellites, Herschel and Planck. During the summer holiday, NSC held an open house for a week for the City of Oslo summer school. In September, NSC had a stand at the Oslo Science Fair. It was visited by many of the 25,000 people who came to the Fair.

In December, the Swedish astronaut Christer Fuglesang lectured in the House of Literature in Oslo and attended a dinner arranged by NSC for politicians and representatives of Norwegian space industries.

Online media mention of The Norwegian Space Centre was relatively stable, with 850 hits during the year. The trend now is toward more frequent and more extensive mention in national media. Visits to the romsenter.no website went up, and NSC is also making use of social media.

Some 1450 Oslo lower secondary school pupils attended talks on space and astronomy at the Space Centre. In

the course of the year, some 60 external professional seminars, international meetings and school lectures were held. In addition, NSC staff members held 200 talks at conferences, for administrators, politicians, schools and fairs. The Norwegian Space Centre provided financial and professional support to carrying out the 2009 Astronomy Year.

In all, 60 Narvik University College and University of Oslo students took part in the student satellite programme that started in 2006. The goal is to build capabilities in space-relevant technologies through student involvement in the development of satellites that will be launched and will deliver data. NSC finances the programme, which is offered by the National Centre for Space-Related Education (NAROM) and the Andøya Rocket Range (ARR).

Oslo, 31.12.2009 • 08.02.2010



Øivind Stene, Styreleder



Jøran Moen



Edel Storelvmo



Paul Narum



Marie Nymark Melle



Bo Andersen, Adm.dirktør

Figures from profit and loss account 2009

NOK 1000 (1€= NOK 8.3034 as per 31 December 2009)	2009	2008
PROGRAMME ACCOUNTS		
<i>Programme income:</i>		
Programme revenue from Ministry of Trade and Industry	460 658	414 300
Other revenues	11 854	10 916
<i>Total programme income</i>	<i>472 512</i>	<i>425 216</i>
<i>Programme expenses</i>		
ESA, Mandatory basic activities	40 174	31 047
ESA, CSG Kourou	11 224	8 517
ESA, Mandatory scientific programmes	86 198	69 891
ESA, Earth observation	68 770	44 859
ESA, Telecommunications	41 882	37 071
ESA, Navigation	44 716	37 932
ESA, Space station, Microgravity and Exploration	14 005	19 785
ESA, Space transportation	15 989	29 224
ESA, Technology development	69 410	74 209
ESA, Esrange Andøya Special Project	30 479	26 682
Radarsat	6 809	5 830
NSC, National support scheme	43 932	34 281
<i>Total programme expenses</i>	<i>473 588</i>	<i>419 328</i>
PROGRAMME RESULT	-1 076	5 888
OPERATING ACCOUNTS		
<i>Operating income:</i>		
Operating revenue from Ministry of Trade and Industry	40 600	37 054
Other operating revenues	45 501	37 825
<i>Total operating income</i>	<i>86 101</i>	<i>74 879</i>
<i>Operating expenses:</i>		
Salaries and social expenses	24 648	21 465
Other operating expenses	57 223	52 706
<i>Total operating expenses</i>	<i>81 871</i>	<i>74 171</i>
Depreciation	609	391
Operating profit	3 621	317
Net financial income	6	65
OPERATING RESULT	3 627	382
TOTAL RESULT	2 551	6 270

Pictorial review of 2009

January

Weightless students

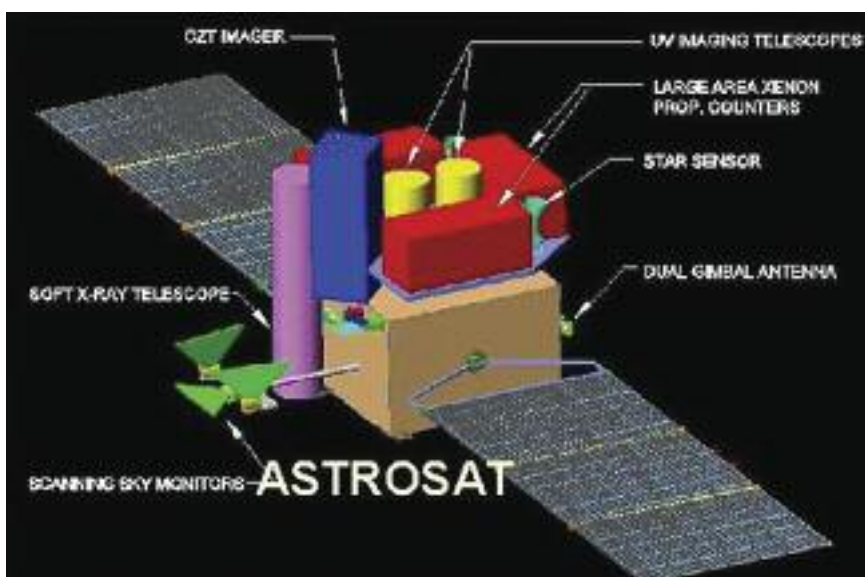
Two NTNU students were selected to perform experiments on board ESA's A300 Zero-G parabolic flight aircraft. The experiments aim to explore the behaviour in microgravity of clay nanoparticles in saline solution. ©ESA - A. Le Floc'h



Space elevator breakthrough

Transporting payloads to space is costly, so scientists have long thought of building a space elevator. ESA engineer Åge Raymond Riise shook up the approaches to elevator design by demonstrating a simple standing-wave approach using a broomstick and brushes.

©NASA, Pat Rawling



On board India's astronomy satellite

An instrument built by Gamma Medica Ideas will be on board the Astrosat satellite to be launched by India in 2011. Called Astrolab, it will chart distant galaxies and black holes by measuring cosmic radiation. ©ISRO

February



Ariane contract to Kongsberg

Kongsberg Defence & Aerospace (KDA) contracted with EADS-Astrium for Ariane 5 booster attachment and separation mechanisms. KDA will deliver mechanisms for a total of NOK 120 million (€14.5 million) for 35 Ariane launch vehicles. ©ESA/CNES/ARIANESPACE

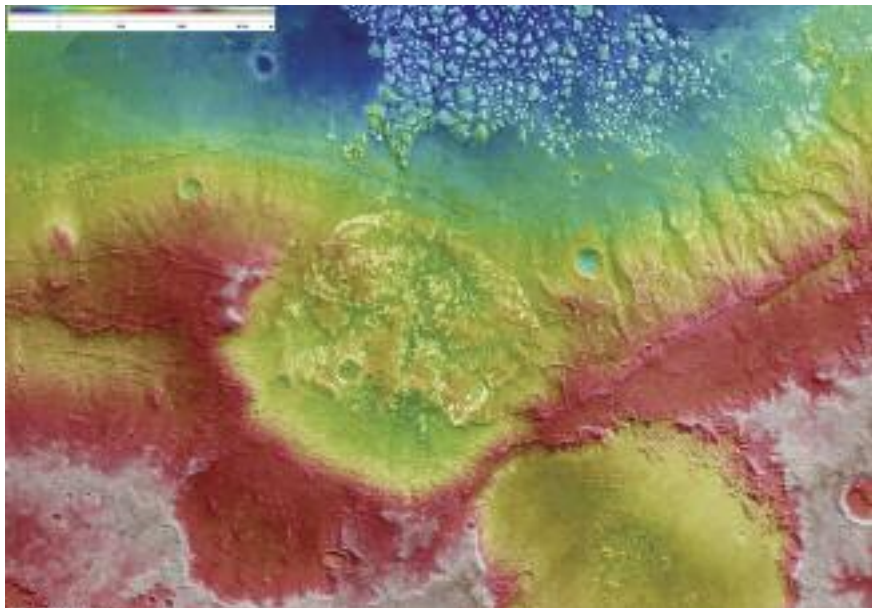


ESA probe life prolonged

The ESA has extended the lifetime of three probes, Venus Express, Mars Express and Cluster, to 2012. So studies of the atmosphere of Venus, the surface of Mars and the Earth's magnetosphere will continue to benefit European research communities. ©ESA

Norwegian ground contact for Swarm

Swarm is a constellation of three ESA satellites that will survey the Earth's geomagnetic field more accurately than ever before. Spacetec of Tromsø is the main contractor for the ground segment that will download, process and distribute the data stream from the satellites. ©ESA/DLR/FU Berlin (G. Neukum)

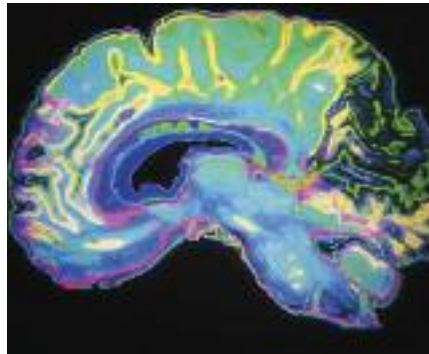


March



ESA recruits in Norway

The European Space Agency wishes to recruit more Norwegians to its staff and visits universities to brief students on the potentials of careers in space activities. ©ESA - A. Le Floch



NASA distinction

Technology developed in the Oslo suburb of Fornebu may be important in Alzheimer's disease research. This is why NASA honoured the Norwegian company Gamma Medica Ideas in a competition for future uses of space technologies. Gamma Medica Ideas came second of 64 entries in the medical innovation class. ©daisydaisy



Scientists increasingly use satellite data

Norwegian scientists increasingly use satellite information. In 2008, a total of 314 scientists and doctoral candidates used satellite data in their projects. The increased use of Earth observation data was most noticeable. ©ESA

April



Year of astronomy begins

The International Year of Astronomy 2009 (IYA 2009) opened in Oslo with a large photo exhibition at the City Hall Square. For three months, the public could enjoy the best astronomical photos of the Sun, the planets, galaxies and star clusters. The 42 photographs in display stands were later shown in Tønsberg, Sandefjord and Sandnes. ©A. O.

Jaunsen



Nammo awarded big contract

Nammo of Raufoss was awarded a five-year, NOK 150 million (€17.2 million) contract for equipment delivery to the Ariane launch vehicles.

©ESA - S. Corvaja, 2009



ESA office opens at Andøya

On 21 April, the European Space Agency (ESA) opened its first office in Norway at Andøya. The National Centre for Space-Related Education (NAROM) will operate the educational office that will deal with continuing education of lower secondary school teachers. ©ARS

May



Levanger pupils' cola can wins

The first national final in the soda-can satellite competition was won by four Levanger upper secondary school pupils. They had designed and built a small satellite with a camera and a temperature sensor in an empty cola can. The win earned them a trip to France and the international CanSat 2009 competition. CanSat aims to inspire young people through practical experience in mathematics, physics and electronics. ©NAROM

Next generation European astronauts

A Brit, a Dane, a Frenchman, a German and two Italians have started astronaut training aimed in part to qualify them for working at the International Space Station within a few years. Some 80 Norwegians were among the 8000 applicants for the training, so competition was keen for the six trainee places.

©ESA - V. Crobu, 2010



Herschel and Planck

The ESA Herschel and Planck space telescopes have ushered in a new epoch in charting the life cycles of stars and in understanding the early universe. The telescopes were orbited 1.5 million kilometres from the Earth, in a mission that began with their launch on an Ariane launch vehicle from French Guiana. University of Oslo astrophysicists took part in the development of a Planck instrument and for two years have exclusive access to its data.

©ESA



June



Together to Mars

Europe and the USA will work together on two unmanned missions to Mars. A landing demonstrator and a probe orbited around the planet are scheduled for 2016. Two years thereafter, the ExoMars ESA rover will drive itself on the surface of Mars; its equipment will include a Norwegian ground radar (see August).

©ESA



Horten electronics in space

Electronic boxes weighing 100 kg were on board TerreStar, the world's largest civilian communications satellite, when it was launched from French Guiana. The equipment comprize frequency converters built by Norspace to improve signal-to-noise ratio. ©ESA



Norway in Galileo project

On 11 July, The Storting (Parliament) approved Norway's full participation in the implementation phase of the Galileo European satellite navigation system. The implementation phase will last until 2013, at a total cost of about NOK 550 million (€66.2 million) divided over five years. The Galileo system will offer improved satellite signals round the globe, most noticeably in the high north. ©ESA

July

Out of isolation

After 105 days, six participants in a simulated mission to Mars came out of an isolation chamber in a laboratory near Moscow. All volunteers, they had gone into isolation to test the effects of long space missions, such as psychological stress. The study was the first part of ESA's comprehensive Mars 500 programme that will continue in 2010. ©ESA



Nature highlights Bergen

A scientific paper on aurorae research conducted at the University of Bergen was the cover feature of the 23 July 2009 issue of Nature. The principal finding reported was that the aurora borealis and aurora australis are not mirror images of each other, as previously assumed.

Moon landing 40 years ago

Forty years ago, on 20 July 1969, an astonished world watched Neil Armstrong's first steps on the Moon. The Moon landing was the result of an American initiative dedicated to regain the lead in space technology held for years by the Soviet Union. When the Apollo programme finished in 1972, 12 American astronauts had walked on the Moon.

©NASA



August



Mapping tropical forests

Optical satellite images have shown that in one year, more than 4700 square kilometres of tropical forest have been cut or burned in Brazil. Brazilian authorities now contemplate cooperation with Norwegian researchers in

the use of radar satellites that can view the Earth in darkness and through clouds. Experience in forest carbon mapping in Norway may be relevant to assessing carbon quantities in tropical forests. *©istockphoto.com/luoman*

Ground radar on Mars

When ExoMars lands in 2018, WISDOM, a Norwegian-developed radar, will chart ice and water to a depth of three metres under the surface. During the 2009 Arctic Mars Alalog Svalbard Expedition (AMASE), WISDOM was tested along with other instruments to be used by ESA and NASA on the unmanned mission to Mars. *©Kjell Ove Storvik*



September



Kongsberg climate contribution

Kongsberg Defence & Aerospace will supply controllers for solar cell arrays and antennas on several of the new European climate monitoring satellites in the Sentinel series. For years, the satellites will supply essential data for economics, research, resource management and social safeguarding.

©ESA - P.Carril

Ship control on the space station

The NORAIS instrument developed in Trondheim went to the International Space Station on a Japanese space vehicle. NORAIS is a further development of the ground-station based Automatic Identification System (AIS)

method of maritime collision avoidance. Norwegian research communities are testing AIS functionality from space, using NORAIS on the Space Station and the AISSat-1 Norwegian satellite to be launched in 2010.

©NASA



October



Better GPS signals

The quality and accuracy of GPS signals across Europe will improve considerably when the EGNOS system becomes operational. The system will be available free to all users and will improve the reliability of positioning services used on offshore platforms, in helicopter transport and in approaches to small airports. ©Oddbjørn Monsen



Thor-6 orbited

On 29 October, Thor-6, Telenor's new communications satellite, was orbited by an Ariane launched from French Guiana. Thor-6 will offer TV and broadband coverage to the Nordic countries, central and eastern Europe.

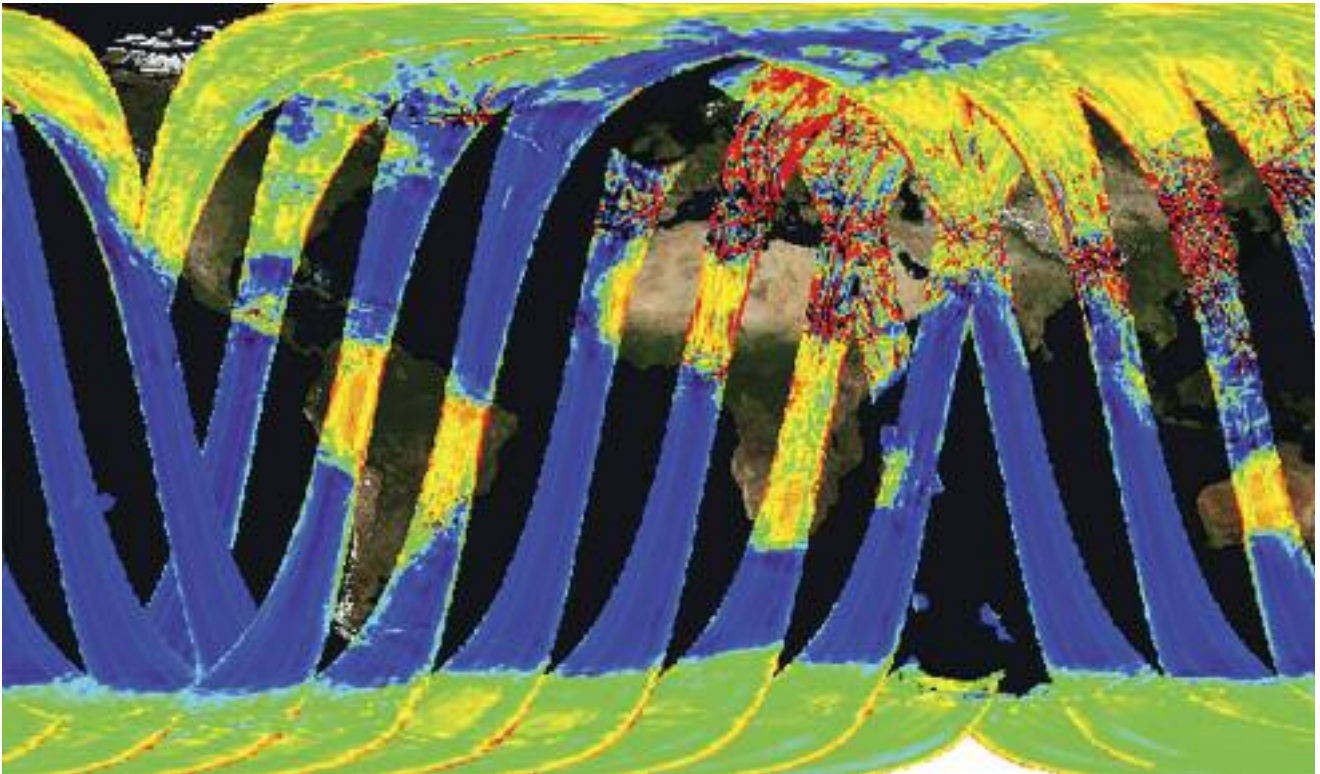
©ESA/CNES/Arianespace

Space activity funding increased

In the 2010 Norwegian national budget, NOK 775 million (€3.3 million) is allocated for space activities. A large part of the increase of NOK 300 million (€6.1 million) over the 2009 budget is earmarked for Norwegian participation in the European Galileo satellite navigation system.



November



Moisture and salinity

ESA's new Soil Moisture and Ocean Salinity (SMOS) satellite will measure parameters linked to the Earth's water cycle, which in turn influences weather and

climate. Consequently, SMOS will be significant in climate modelling and for managing water resources and agriculture. ©ESA

Unique Mars moon images

For the first time, Phobos and Deimos, the moons of Mars, have been photographed together. The photo was long planned, as the two moons seldom can be viewed

together. The image was made possible by the elliptic orbit of the Mars Express orbiter, and the exact knowledge of the orbits of the two moons and the planet.

©ESA/DLR/FU Berlin (G. Neukum)



December



Ariane launch 30 years ago

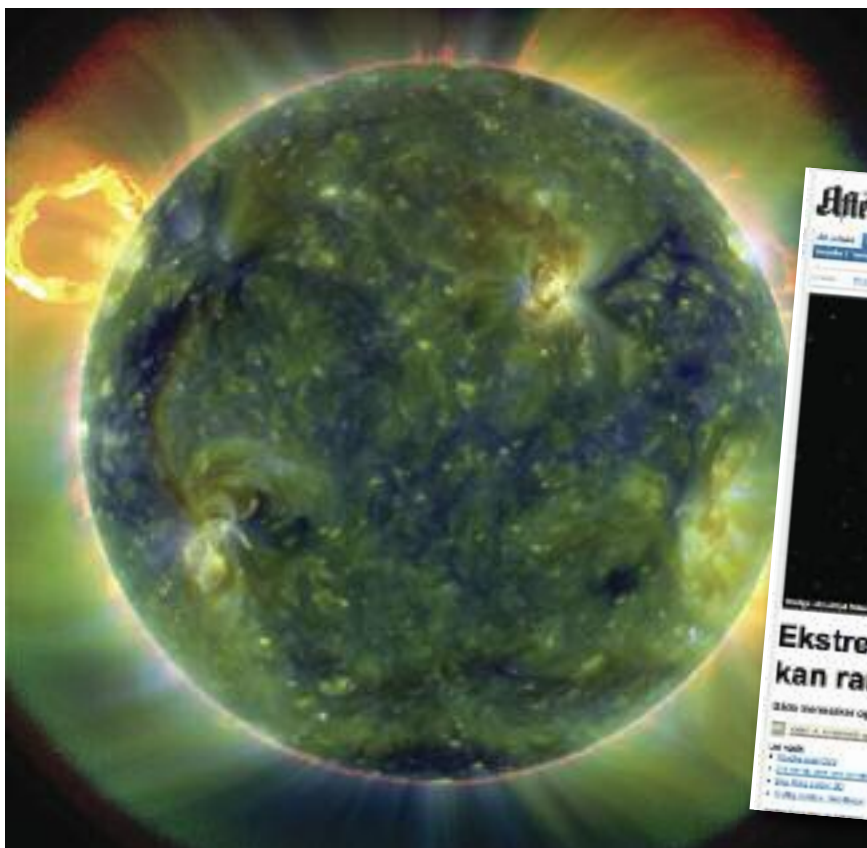
On 24 December 1979, the ESA member countries launched their first rocket. That was the start of 30 years of commercial and technical success for ArianeSpace. Little by little, Norwegian companies have become important Ariane production suppliers. ©Arianespace

Space industry ombudsmen

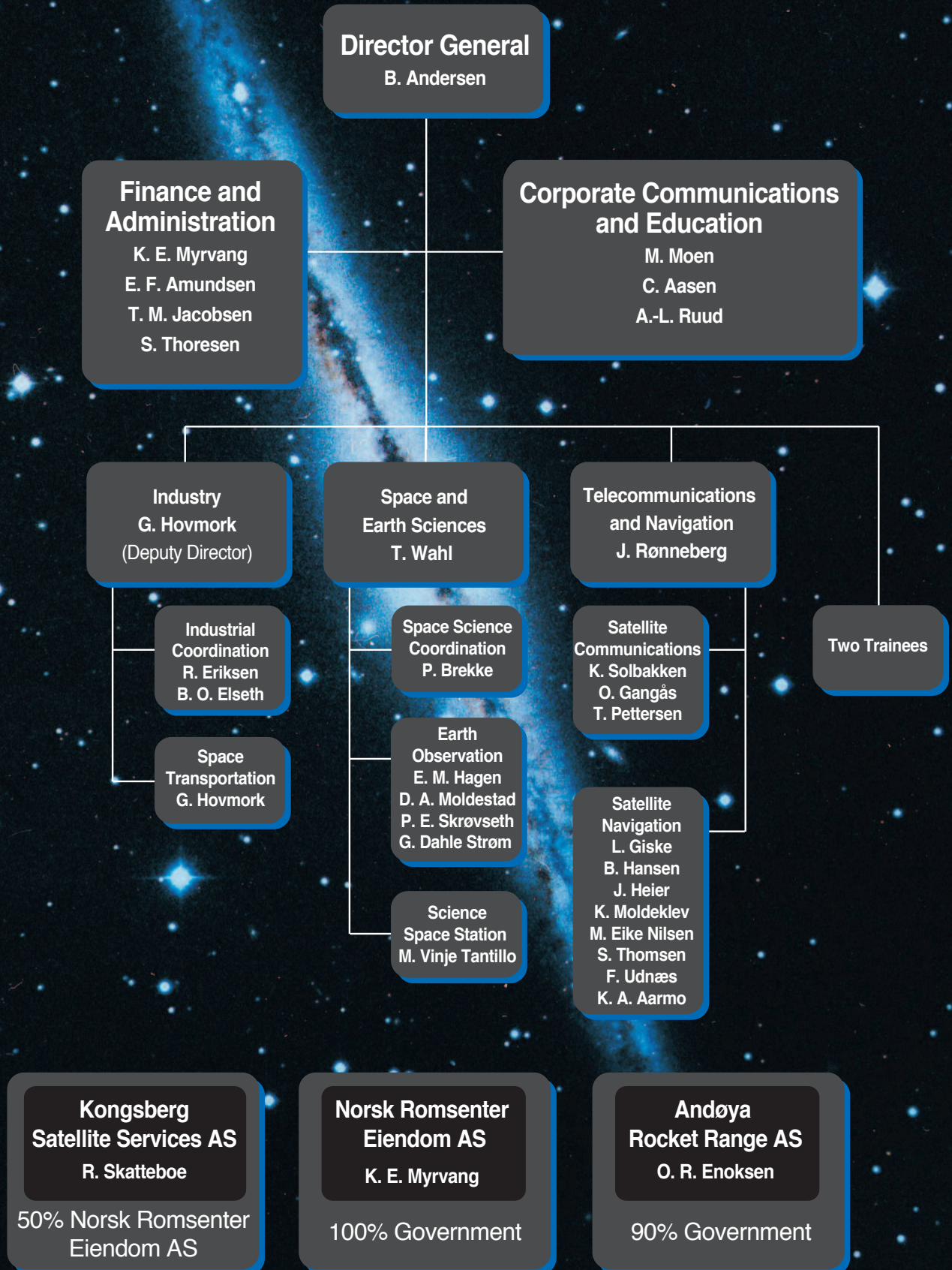
At the behest of its member countries, the ESA has appointed two ombudsmen, former Centre National d'Etudes Spatiales (CNES) researcher Alain Gaubert and former Norwegian Space Centre Director Rolf Skår. Together, Gaubert and Skår will mediate conflicts arising in contract negotiations. ©Norsk Romsenter

Most read

Each year in late December, Aftenposten, Norway's leading newspaper, compiles a list of the year's articles most read online. In 2009 an article in the 21 January edition of Aftenposten on the vulnerability of the Earth to extreme space weather was in first place. The article was based on information published on the Norwegian Space Centre website. ©NASA/Aftenposten



Organization of the Norwegian Space Centre as per 1 May 2010





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ISBN 978-82-7542-095-2
NSC-Report(2010)5
Oslo, October 2010

Layout: Pål Nordberg, Grafisk Design
Printed by: Kraft Digitalprint AS

